

ESTIMATING THE LONG TERM PATTERN  
OF WATER STREAMFLOW WITH CLIMATE  
CHANGE ADAPTATION

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## **SUPERVISOR'S DECLARATION**

I hereby declare that I have checked this thesis and in my opinion, this thesis is adequate in terms of scope and quality for the award of the Bachelor Degree of Civil Engineering with Hons.

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Date :



## **STUDENT'S DECLARATION**

I hereby declare that the work in this thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Malaysia Pahang or any other institutions.

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## TABLE OF CONTENT

DECLARATION	
TITLE PAGE	
ACKNOWLEDGEMENTS	ii
ABSTRAK	iii
ABSTRACT	iv
TABLE OF CONTENT	v
LIST OF TABLES	viii
LIST OF FIGURES	ix
LIST OF ABBREVIATIONS	x
<b>CHAPTER 1 INTRODUCTION</b>	<b>1</b>
1.1 Introduction and Background	<b>Error! Bookmark not defined.</b>
1.2 Statement of the Problem	<b>Error! Bookmark not defined.</b>
1.3 Objectives of Study	3
1.4 Scope of Study	3
1.5 Significant of Study	<b>Error! Bookmark not defined.</b>
<b>CHAPTER 2 LITERATURE REVIEW</b>	<b>5</b>
2.1 Introduction	<b>Error! Bookmark not defined.</b>
2.2 Climate Modelling	7
2.2.1 Energy Balance Models (EBMs)	8
2.2.2 Radiative-Convective Models (RCMs)	<b>Error! Bookmark not defined.</b>
2.2.3 Statistical-Downscaling Models (SDSM)	10

2.2.4	General Circulation Models (GCM)	11
2.3	Providing Regional Climates for Impact Studies (PRECIS)	12
2.4	Rainfall-Runoff Modelling	13
2.4.1	Empirical Models	<b>Error! Bookmark not defined.</b>
2.4.2	Conceptual Models	<b>Error! Bookmark not defined.</b>
2.4.3	Theoretical Models	15
2.4.4	The IHACRES Model	15
<b>CHAPTER 3</b>	<b>METHODOLOGY</b>	<b>17</b>
3.1	Introduction	17
3.2	Analysis of Missing Data	19
3.3	Statistical Downscaling Model (SDSM) Methodology	20
3.3.1	Predictors Selection	23
3.4	IHACRES Model Methodology	25
3.5	Description of Site Study	25
<b>CHAPTER 4</b>	<b>RESULTS AND DISCUSSION</b>	<b>29</b>
4.1	Climate Trend at Site Study	29
4.1.1	Temperature Simulation Result	30
4.1.2	Rainfall Simulation Result	35
4.1.2.1	Predictors Selection through Screening Process	35
4.1.2.2	The Calibrated and Validated Performance	36
4.1.2.3	Rainfall Trend in Year 2040-2069	38
4.2	Hydrological Model	39
4.2.1	Rainfall-Runoff Prediction Model	39
4.2.1.1	Streamflow Simulation Using IHACRES Model	39

4.2.1.2 Streamflow Trend in the Year 2040-2069	41
<b>CHAPTER 5 CONCLUSION</b>	<b>43</b>
5.1 Conclusion	43
5.2 Recommendation	44
REFERENCES	46
APPENDIX A	47
APPENDIX B	48
APPENDIX C	49
APPENDIX D	50
APPENDIX E	51
APPENDIX F	52
APPENDIX G	53



## LIST OF TABLES

<b>Table 3.1:</b> List of predictors in the SDSM analysis	24
<b>Table 3.2:</b> Site location and site station of the study	27
<b>Table 4.1:</b> List of selected temperature predictors	30
<b>Table 4.2:</b> Calibrated model parameters value for IHACRES model	40

## LIST OF FIGURES

<b>Figure 3.1:</b> Flow chart of research methodology	18
<b>Figure 3.2:</b> Example of analysis table	21
<b>Figure 3.3:</b> SDSM version 4.2.9 climate scenario generation	23
<b>Figure 3.4:</b> Map of Pahang state	<b>Error! Bookmark not defined.</b>
<b>Figure 4.1:</b> Calibrated result 1984-1998 for the maximum temperature using the SDSM model	32
<b>Figure 4.2:</b> Calibrated result 1984-1998 for the mean temperature using the SDSM model	32
<b>Figure 4.3:</b> Calibrated result 1984-1998 for the minimum temperature using the SDSM model	32
<b>Figure 4.4:</b> Validated result 1999-2013 for the maximum temperature using the SDSM model	<b>Error! Bookmark not defined.</b>
<b>Figure 4.5:</b> Validation result 1999-2013 for the mean temperature using the SDSM model	33
<b>Figure 4.6:</b> Validation result 1999-2013 for the minimum temperature using the SDSM model	<b>Error! Bookmark not defined.</b>
<b>Figure 4.7:</b> Projected maximum temperature for year 2040-2069	<b>Error! Bookmark not defined.</b>
<b>Figure 4.8:</b> Projected mean temperature for year 2040-2069	<b>Error! Bookmark not defined.</b>
<b>Figure 4.9:</b> Projected minimum temperature for year 2040-2069	34
<b>Figure 4.10:</b> Correlation values of rainfall station	36
<b>Figure 4.11:</b> Calibrated result 1982-1996 for rainfall station using SDSM model	37
<b>Figure 4.12:</b> Validated result 1997-2011 for the rainfall station using the SDSM model	<b>Error! Bookmark not defined.</b>
<b>Figure 4.13:</b> Projected rainfall trend for year 2040-2069	39
<b>Figure 4.14:</b> The calibrated 1999-2004 and validated 2005-2009 for streamflow	41
<b>Figure 4.15:</b> Projected streamflow trend for year 2040-2069	42

## LIST OF ABBREVIATIONS

SDSM	Statistical Downscaling Model
DD	Dynamical Downscaling
SD	Statistical Downscaling
GCM	Global Circulation Model
RCM	Regional Circulation Model
NCEP	National Centers for Environmental Prediction
MMD	Malaysia Meteorological Department
DID	Department of Irrigation and Drainage
MAE	Mean Absolute Error
DAT	predictand
OUT	output
PAR	parameter
MOS	model output statistic
mlsp	mean sea level pressure
p <sub>f</sub>	surface airflow strength
p <sub>u</sub>	surface zonal velocity
p <sub>v</sub>	surface meridional velocity
p <sub>z</sub>	surface vorticity
p <sub>th</sub>	surface wind direction
p <sub>zh</sub>	surface divergence
p5 <sub>f</sub>	500hpa airflow strength
p5 <sub>u</sub>	500hpa zonal velocity
p5 <sub>v</sub>	500hpa meridional velocity
p5 <sub>z</sub>	500hpa vorticity
p500	500hpa geopotential height
p5th	500hpa wind direction
p5zh	500hpa divergence
p8 <sub>f</sub>	850hpa airflow strength
p8 <sub>u</sub>	850hpa zonal velocity
p8 <sub>v</sub>	850hpa meridional velocity
p8 <sub>z</sub>	850hpa vorticity
p850	850hpa geopotential height
p8th	850hpa wind direction
p8zh	850hpa divergence

r500	relative humidity at 500hpa
r850	relative humidity at 850hpa
rhum	near surface relative humidity
shum	surface specific humidity
temp	mean temperature